



## QuickCarrier™ USB-D

---

MTD-H5 and MTD-EV3 Best Practices

## QuickCarrier USB-D MTD-H5 and MTD-EV3 Best Practices

S000600, Version 1.1

### Copyright

This publication may not be reproduced, in whole or in part, without prior expressed written permission from Multi-Tech Systems, Inc. All rights reserved. Copyright © 2014 by Multi-Tech Systems, Inc.

Multi-Tech Systems, Inc. makes no representations or warranties, whether express, implied or by estoppels, with respect to the content, information, material and recommendations herein and specifically disclaims any implied warranties of merchantability, fitness for any particular purpose and non-infringement.

Multi-Tech Systems, Inc. reserves the right to revise this publication and to make changes from time to time in the content hereof without obligation of Multi-Tech Systems, Inc. to notify any person or organization of such revisions or changes.

### Trademarks

QuickCarrier is a trademark. The Multi-Tech logo are registered trademarks of Multi-Tech Systems, Inc. All other brand and product names are trademarks or registered trademarks of their respective companies.

### Contacting Multi-Tech

#### Knowledge Base

The Knowledge Base provides immediate access to support information and resolutions for all Multi-Tech products. Visit [http://www.multitech.com/kb.go\\_](http://www.multitech.com/kb.go_)

#### Support Portal

To create an account and submit a support case directly to our technical support team, visit: <https://support.multitech.com>

#### Technical Support

Business Hours: M-F, 9am to 5pm CT

Country	By Email	By Phone
Europe, Middle East, Africa:	<a href="mailto:support@multitech.co.uk">support@multitech.co.uk</a>	+(44) 118 959 7774
U.S., Canada, all others:	<a href="mailto:support@multitech.com">support@multitech.com</a>	(800) 972-2439 or (763) 717-5863

### World Headquarters

Multi-Tech Systems, Inc.  
2205 Woodale Drive  
Mounds View, Minnesota 55112  
Phone: 763-785-3500 or 800-328-9717  
Fax: 763-785-9874

# Contents

---

<b>Overview .....</b>	<b>4</b>
Related Documentation .....	4
For MTD-H5 Devices .....	4
For MTD-EV3 Devices.....	4
<b>Installing and Removing SIM Cards in an MTD-H5 .....</b>	<b>5</b>
Installing a SIM Card.....	5
Removing a SIM Card .....	6
SIM cards that require a PIN to unlock SIM before use .....	6
<b>Powering Devices On and Off .....</b>	<b>7</b>
Powering On the Device.....	7
Powering Off or Rebooting a Device .....	7
<b>Basic Operations .....</b>	<b>8</b>
Preparing the Modem for a Data Connection .....	8
Using the Radio IP Stack to Make a Data Connection.....	8
Using the Host System IP Stack to Make a Data Connection.....	8
Using the Internal IP Stack to Disconnect a Data Connection .....	8
Using the Host IP Stack Disconnect a Data Connection .....	8
<b>Responding to Failed Connections .....</b>	<b>9</b>
When your device fails to connect.....	9
When a call drops.....	9
Carrier Issues MTD-H5 .....	9
<b>Customer Contact Information .....</b>	<b>Error! Bookmark not defined.</b>
<b>Carrier Information for MTD-EV3.....</b>	<b>11</b>
Verizon Activation.....	11
Sprint Activations .....	11
#9XX OMA Unsolicited Indications .....	12
PRL Updates .....	15
For Sprint.....	15
For Verizon.....	15
Other Carrier Notes.....	15

# Overview

The MTD is a complex computer system that contains a radio, a processor, flash memory and RAM. The system is interacting with a cellular network while trying to talk to the host system it is connected to.

Following these guidelines will help preserve the system in the best possible way.

## Related Documentation

For more information re following documentation is available on the Multi-Tech Installation Resources website at [www.multitech.com/setup/product.go](http://www.multitech.com/setup/product.go).

### For MTD-H5 Devices

Document	Description
QuickCarrier USB-D MTD-H5 User Guide	Provides an overview, specification, safety and regulatory information, and SIM cards and basic operations. (Part: S000551)
USB Driver Installation Guide for H5 and G3 Devices	Instructions for installing USB drivers on Linux and Windows Systems (Part: S000553)
HSPA+ AT Commands Reference Guide	Provides AT Command for configuring your device. (Part: S000574)

### For MTD-EV3 Devices

Document	Description
QuickCarrier USB-D MTD-EV3 User Guide	Provides an overview, specification, safety and regulatory information, and basic operations. (Part: S000570)
USB Driver Installation Guide for EV3 and C2 Devices	Instructions for installing USB drivers on Linux and Windows Systems. (Part: S000569)
EV-DO and CDMA AT Commands Reference Guide	Provides AT Commands for configuring your device. (Part: S000546)

# Installing and Removing SIM Cards in an MTD-H5

---

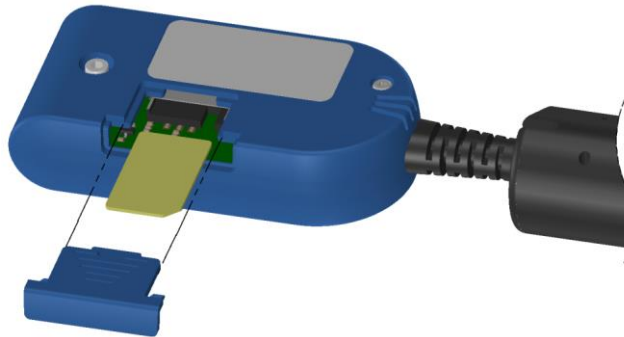
## Installing a SIM Card

Only MTD-H5 models have a SIM card.

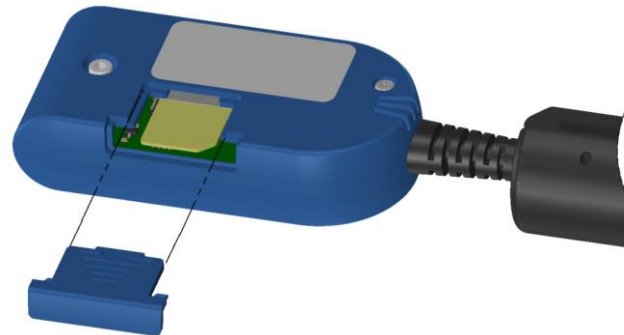
**Warning:** If the device is connected to a computer or power supply, disconnect it. Inserting or removing a SIM card with the device powered may harm the SIM card and the device.



1. Remove the SIM cover from the back of the device. If you have trouble sliding the SIM cover, use a flat-blade screwdriver in the slot on the SIM cover to slide it out.



2. Insert the SIM card into the card holder with the gold contact side facing down as shown.



3. Verify that the SIM card fits into the holder properly and replace the cover.

## Removing a SIM Card

To remove a SIM card:

**Warning:** If the device is connected to a computer or power supply, disconnect it. Inserting or removing a SIM card with the device powered may harm the SIM card and the device.



Remove the SIM cover from the back of the device. If you have trouble sliding the SIM cover, use a flat-blade screwdriver in the slot on the SIM cover to slide it out.

- Slide the SIM card out.
- Replace the SIM cover.

## SIM cards that require a PIN to unlock SIM before use

AT+CPIN=XXXXXX is the command to set and read the PIN used for the SIM card. Entering an invalid PIN or entering a PIN for a SIM that doesn't require one could cause the SIM to become locked. Typically XXXX failures while trying to enter the SIM PIN may lock the SIM.

# Powering Devices On and Off

---

## Powering On the Device

These devices are USB powered and do not have a power button.

**Note:** Make sure the USB hub, whether external or internal, can provide adequate power. Max Peak current is in the range of 700mA for EV3 and 1.2A for H5. Refer to the device's User Guide for more information.

If the host system can't provide enough power, then the 5V rail bounces, which causes the modem to lose power prematurely and could damage to the modem. Each port on the USB hub should support 500mA at 5V. If the system has inadequate power, voltage droops when additional devices are plugged into the hub (for example, when a modem is plugged into first port, plugging a USB flash drive into the second port, causes the modem to reset).

To power on the device:

1. Plug the device into the USB port and give it time to initialize.
2. Wait 10 seconds after plugging the device into the USB port before giving the modem any commands. The 10 seconds allows the modem to reach the activation state.

Disconnecting it or shutting off the computer, turns it off.

**Note:** When reconnecting the device, use the same USB port that you used when installing drivers. Otherwise, you may need to re-install the driver.

## Powering Off or Rebooting a Device

To power off your device:

1. Suspend dial-up networking to disconnect the data connection and keep the application from attempting to redial.
2. Suspend any other modem queries. (Sometimes separate apps are talking to the modem, initializing, or accessing modem status information.)
3. Wait for Steps 1-2 to complete so the modem is disconnected.
4. Issue **AT#SHDN** and wait for **OK**.
  - You can issue this command through a power down app that sends this command before removing power.
  - Some terminal communication scripts send AT commands to the modem.
5. Wait 30 seconds after the OK to allow the radio to disconnect from the carrier and close out file systems. It is now safe to remove power or unplug the MTD.

# Basic Operations

---

## Preparing the Modem for a Data Connection

Set the APN by issuing the following command where <APN Name> is the APN assigned by the carrier:

- `AT+CGDCONT=1,"IP", "<APN Name>"`

Check for registration by issuing `AT+CREG?<cr>` and wait for the response. If the second value of the response (for example, `+CREG: x,y`) is 1, then the modem is registered on the home network. If `y=5`, then the modem is registered but roaming. See the AT command reference guide for other possible responses. If the second value is not 1 or 5, then do not attempt to dial. Wait ~5 seconds for the modem to finish registration and check `+CREG` again.

## Using the Radio IP Stack to Make a Data Connection

Connect by issuing the command: `AT#SGACT=1,1` (using PDP context #1)

## Using the Host System IP Stack to Make a Data Connection

This device only supports packet data connections, such as dial-up networking. To make a data connection, you must use a PPP dialer. If your carrier requires a username and password for the Internet connection, be sure to enter that information into the PPP dialer. Dial up using `ATD*99***1#` (using PDP context #1).

## Using the Internal IP Stack to Disconnect a Data Connection

Issue the following command to disconnect: `AT#SGACT=1,0`

## Using the Host IP Stack Disconnect a Data Connection

The method to disconnect depends on the type of PPP dialer that was used to establish the data connection.



# Responding to Failed Connections

---

## When your device fails to connect

Verizon recommends working through the steps below until your device connects:

Wait 30 seconds and try again.

- Wait 1 minute and try again.
- Wait 2 minutes and try again.
- Wait 8 minutes and try again.
- Make one attempt every 15 minutes for an hour.
- Make one attempt every 90 minutes.

## When a call drops

If a connected call drops for any reason:

- Wait 30 seconds and restart the sequence again.

## Carrier Issues MTD-H5

Congested cellular towers may bump data devices since voice calls take priority. Idle data devices may also experience dropped connections.

# Getting Help

---

Several things can affect cellular modem service. Who you contact for help depends on what issue you are having:

Contact the Cellular Carrier (SIM card provide for MTD-H5 models) for the following:

- Issues with account configuration.
- SIM card does not appear to be working.
- Cannot activate the radio.
- Radio appears to be activated, but you cannot get a data connection. (Verify that your account is configured for packet data.)
- Questions about data usage.

Contact MultiTech

- Any other questions – Contact Multi-Tech at our Online Support Portal <http://support.multitech.com>.

# Carrier Information for MTD-EV3

---

## Verizon Activation

1. Send ATD\*22899;<cr>
2. Wait for response OK
3. Wait for response #OTASP:0
4. Wait for response #OTASP:1
5. Wait for response #OTASP:2
6. Modem will reset when done with the activation.
7. Close terminal program
8. Unplug and replug the USB cable
9. Check registry with AT\_REG?

Check the Multi-Tech web site for the latest information regarding activations.

## Sprint Activations

Sprint performs OTA activations automatically. Watch for their OMA messages for various Sprint updates. Do not power off or reset the unit if the device is in the middle of an OTA update.

Applications should look for the following unsolicited OMA indications at all times:

#904	HFA Started
#905	PRL - Session started
#906	DC - Session started
#907	FUMO -Session started

If application sees one of these indications it should not attempt to issue commands, attempt data connection, or reset device until the OMA process is complete as indicated by additional #9XX OMA success or failure indications below.

If the device is in a data connection when a Network Initiated PRL, DC, or FUMO update alert message is received from Sprint the radio will wait for a point where data is not being transmitted, then “gracefully” close the data connection, and then start OMA-DM process with #9xx indication. When this occurs the application should not attempt to issue AT commands, attempt to start data connection again, or reset device in an attempt to regain control. Application should wait for a #9xx indication the process has completed before proceeding.

Be aware after the HFA process is successfully completed the radio will be reset. The radio may also reset after other OMA functions.

## #9XX OMA Unsolicited Indications

#900 DM Client Ready

### Hands Free Activation HFA Notifications

#901 HFA Attempt #  
#902 HFA Countdown Timer (seconds)  
#904 HFA Started  
#911 HFA Error - credential error  
#912 HFA Error - unreachable server  
#913 HFA Error - network error  
#914 HFA Done - HFA success  
#922 HFA Done - No profile received  
#923 HFA Error – ETC  
#924 HFA Cancelled  
#DREL Data session release

### Network Initiated Device Configuration (NIDC) or Client Initiated Device Configuration (CIDC)

#906 DC - Session started  
#911 DC - Error - credential error  
#912 DC - Error - unreachable server  
#913 DC - Error - network error  
#915 DC - Error - update fails for other reasons  
#918 DC - Done - success  
#924 DC - Cancelled - no profile received  
#DREL Data session release

### Network Initiated or Client Initiated Preferred Roaming List (NIPRL or CIPRL) Download

#905 PRL - Session started  
#909 PRL - Done - PRL success  
#910 PRL - Done - No PRL update  
#911 PRL - Error - credential error  
#912 PRL - Error - unreachable server  
#913 PRL - Error - network error  
#915 PRL - Error - update failed for other reasons  
#DREL Data session release

## Network Initiated (NI) or Client Initiated (CI) Firmware Update Management Object (FUMO) Notifications

#907	FUMO - Firmware DM session started or started again until no more updates are available
#911	FUMO - credential error
#912	FUMO - unreachable server
#913	FUMO - network error
#915	FUMO – update fails with other reasons
#916	FUMO - Firmware done, no firmware update
#919	FUMO - Firmware downloaded successfully
#920	FUMO - Firmware download progress (percent)
#921	FUMO - Firmware download start
#921	FUMO - Firmware size get from the OMA-DM server (byte)
#929: 200	FUMO - Firmware Update Success
#929: 402	FUMO - Firmware corrupted , CRC error
#929: 403	FUMO - Firmware package mismatch
#929: 404	FUMO - Firmware signature failed
#929: 406	FUMO - Firmware update authentication failed
#929: 410	FUMO - Firmware update General Error #930 FUMO - Firmware Reporting Firmware Update result to server
#DREL	Data session release

## Additional Network Initiated Alert Indications (NIA Retry)

#926	NIA - NIA retry start
#927	NIA - Notification done with no NIFA information
#928	NIA - NIA digest mismatch error

## OMA-DM Commands

These commands are available after the unsolicited indication #900 appears, which means DM client is ready.

AT#OMADMSVADDR=<URL>	Set OMA-DM server address (default <a href="https://oma.ssprov.sprint.com/oma">https://oma.ssprov.sprint.com/oma</a> )
AT#OMADMSVADDR?	Read OMA-DM server address
AT#OMADMSVPORT=<port#>	Set OMA-DM server (default 443)
AT#OMADMSVPORT?	Read OMA-DM server
AT#OMADMPROXY=<port#>,<URL>	Set OMA-DM proxy server port/URL (default <a href="http://oma.ssprov.sprint.com:80">http://oma.ssprov.sprint.com:80</a> )
AT#OMADLPROXY=<port#>,<URL>	Set OMA-DL Proxy DL Server Port URL (default <a href="http://oma.ssprov.sprint.com:80">http://oma.ssprov.sprint.com:80</a> )

AT+OMADMCEN=<onoff>	Set OMA-DM Client feature Disable=0, Enable=1
AT#OMADMCEN?	Query the current OMA-DM client status
AT+OMADMCEN=?	Query OMA-DM available values
	Set OMA-DM Client Initiated Device Configuration
AT+OMADM=(onoff)	Disable=0, Enable=1, Initiate=2 (Many OMA commands will result in error if OMADMCEN=0 is set)
AT+OMADM=?	Query OMA-DM Client Initiated Device setting
AT+PRL=<onoff>	Set OMA-DM CIPRL Session
	Disable=0, Enable=1, Initiate=2
AT+PRL=?	Query OMA-DM CIPRL Session setting
AT+FUMO=	Set OMA-DM FUMO enable parameter
	Disable=0, Enable=1, Initiate=2
AT+FUMO=?	Query OMA-DM FUMO parameter
AT#HFA	Initiate Sprint Hands Free Activation (HFA)
AT#HFACANCEL	Cancel Sprint Hands Free Activation (HFA) DM Session
AT#SPRTN=xxxxxx	HFA Reset (after device reboot HFA will occur) xxxxxx= SPC or MSL (currently last 6 digits MEID)
AT#DCCANCEL	Cancel Device Configuration (DC) Session
AT#PRLCANCEL	Cancel Preferred Roaming List (PRL) Session
AT\$PRL?	Query Preferred Roaming List (PRL) ID #
AT#FUMOCANCEL	Cancel Firmware Update Management Object (FUMO) session.

## PRL Updates

The Preferred Roaming List (PRL) is a database file that includes cell tower IDs and capabilities, a prioritized list of towers the device is allowed to connect to, and the preferred connection order. Consider updating your PRL if you have connection problems or if your carrier is updating cell towers in your area.

PRL updates for Sprint and Verizon are over the air updates. To update your PRL, issue the following commands.

### For Sprint

- AT+PRL=2

### For Verizon

- AT+CDV\*22899

## Other Carrier Notes

Congested cell towers may bump data devices.